

A TRIBUTE TO THE CONTRIBUTIONS OF PROFESSOR JACK MAJOR

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Jack Major, Professor Emeritus of Plant Ecology at the University of California, Davis (UCD), died 13 February 2001 in Davis at the age of 83. Professor Major had a profound impact on the direction of plant ecology in the United States during the second half of the 20th century. His contributions to ecologists and land managers in California are particularly important, and those contributions were highlighted by the editors of *Madrono* in a 1982 issue dedicated to him (Parsons 1982; Anonymous 1982).

Jack's academic home for most of his career was the UCD Botany Department, where he taught from 1955 until retirement in 1981. His spiritual home, however, was in the mountains: the Uinta Mountains of Utah, the Sierra Nevada of California, the Grand Tetons of Wyoming, the Brooks Range and the Juneau ice fields of Alaska, and the Himalayas of Nepal. This was the environment that he most often shared with graduate students and those undergraduates fortunate enough to take his plant ecology classes. He truly was the ideal scientist described by Poincaré (1958), as someone who "... does not study Nature because it is useful to do so. He studies it because he takes pleasure in it ... [and] because it is beautiful."

Jack was born 15 March 1917 in Salt Lake City, UT and completed high school there in 1935. He went on to Utah State Agricultural College (now Utah State University) and received a BS in Range Management in 1942. For the next several years he served in the Army's 10th Mountain Division, the justifiably famous unit of 1000 skiers and alpinists who trained hard in the mountain west before participating in the Italian campaign (Fig. 1). After the war, a number of men from that Division went on to become conservationists, ecologists, and leaders in the promotion of recreational skiing. Between 1946 and 1953, Jack attended graduate school at the University of California, Berkeley, obtaining a PhD in Soil Science under the direction of Professor Hans Jenny. During this time he also met and married Mary Cecil, thanks to an introduction from brother Ted who had met Mary by chance on a rock climbing expedition in the Grand Tetons. She, too, had a love for the mountains. Mountain landscapes and vegetation remained lifetime passions for both of them and for their sons, as celebrated in Paul Castelfranco's 1988 poem, "Voices of the mountains:"

I listened to voices/The innumerable voices/Of
the mountains. . .
Voices of red lava pinnacles/Voices of grey granite
boulders. . .
And up the ridge/Above the forest/Above the
meadow/
Through lodgepole, hemlock/And timberline.
From the crest I could see/Vast basins of granite/
And blue silhouettes/
In the distance.../
I listened/To all these voices/To the one complex
chorus/Of the mountain.

Jack was hired as a member of a young weed science group in the Botany Department at UCD (Fig. 2). His strong interest in the ecology of undisturbed mountain vegetation, however, conflicted with the weed group's focus on plants in agronomic, low-elevation settings. This habitat bias gradually distanced him from weed science, and a 1964 Fulbright Fellowship to Innsbruck, Austria was to cement a lifetime's focus on vegetation science.

He had a driving curiosity that made him an extensive reader of, and correspondent with, scientists who specialized in a wide range of topics, including those who wrote in other languages. As a result, he was far ahead of his time. For example, we have correspondence in 1948 between Jack and Sewal Wright, one of the major contributors to the synthesis of Darwinism and Mendelism. Wright responded to Major's query of how to determine the relative importance of multiple interacting factors that explain a plant community's distribution limits, by describing his own original statistical method, path analysis. Path analysis has only been used regularly in the ecological literature for the past dozen years, but it was part of Jack's education 40 years earlier. Another example: Inspired by his major professor's book (Jenny 1941), *The factors of soil formation*, he wrote a paper (Major 1951) that proposed to use differential equations to describe the sum of vegetation-environment relationships for any given plant community. Not for another quarter of a century, however, did any ecologist actually begin to *use* differential equations in models of plant communities.

Several aspects of the Jenny/Major approach may now appear to be naive. Today—instead of relating attributes of soils or vegetation directly to the factors of soil formation—a clear distinction between, processes and factors seems now to be the more productive way to go (Humphreys and Paton 1998). But we must remember that Major's 1951 paper was written in a pre-ordination era before adequate canonical multivariate techniques with permutation tests and computers were available to test his hypotheses.

One measure of Professor Major's vision and impact is the fact that several of his earliest papers are still cited today, in some cases more often now than originally. According to the ISI Web of Science, "A functional, factorial approach to plant ecology" has been cited 91 times in the past 25 years. His superb synthesis of the California flora, geology, and ecology ("Endemism and speciation



FIG. 1. Corporal Jack Major when a member of the 10th Mountain Division, 1944. Photo courtesy of (then Sergeant) Don Bothwick.



FIG. 2. Assistant Professor Jack Major in 1956 as a new faculty member at UC Davis while on a departmental field trip at Calaveras Big Trees State Park. Photo courtesy of Roman Gankin.

in the California flora," Stebbins and Major 1963) has been cited 102 times in the same period, and his most-often cited paper, "Buried viable seeds in California bunchgrass sites and their bearing on the definition of flora," (Major and Pytott 1956) has been cited 138 times, and is still being cited at the rate of seven times per year for the past 5 years. His work on primary succession following glacial retreat (Crocker and Major 1955) is a classic, cited and described in many textbooks nearly a half-century later (e.g., Barbour et al. 1999; Begon et al. 1996; Krebs 2001) and in recent reviews on succession (Wali 1999).

Jack was one of very few Americans to practice the phytosociological protocols widely used in Europe (and throughout the non-English-speaking world) for the sampling and classification of vegetation. Consequently, releve sampling and syntaxonomy were employed by most of Jack's students in their dissertations (e.g., Neilson 1961; Pemble 1970; Taylor 1976; Burke 1979; Benedict 1981). Jack's gentle leadership in pulling reluctant American ecologists across a then-narrow bridge of communication into the rest of the world, was without doubt of seminal help later to Robert Whittaker in the 1970s when his travels and publications widened that bridge. Only now—20–30 years after his students have finished their graduate degrees—are phytosociological papers becoming accepted and publishable in the US.

Professor Major was the opposite of a bandwagon-

on scientist. He preferred to go in his own sense of an appropriate direction, even when he was so far ahead of others that few understood his choice or took the same route. Paul Castelfranco's 1991 poem, "Epitaph," captures this aspect of his personality: "And on his grave some kindly person wrote/ Never did he jump on a bandwagon . . . /He preferred to walk."

Throughout his career, Dr. Major was as well-known for his reviews of ecological books written in other languages as for his own research. The journal *Ecology* alone published 158 of his book reviews, most of them of works written in French, German, and Russian. These detailed reviews brought foreign news and ideas to the attention of otherwise ethnocentric and linguistically challenged American ecologists. In 1975 the Ecological Society of America gave him its first Distinguished Service Citation specifically for his his prodigious reviewing activity, judged to be an outstanding service to Society members. According to then-President Richard Miller (1975), "Major's reviews have consistently pointed out gaps in our own knowledge of American ecosystems and have indicated directions for fruitful new research . . . [We] would be immeasurably poorer without his dedicated efforts." Unfortunately, his encyclopedic knowledge of the literature has only partially been preserved in his papers, reviews, and bibliographies (Major and Rejmanek 1988/9). Unfortunately, also, is the fact that this kind of selfless scholarly work is poorly rewarded by the usual academic promotion process. Dr. Major's tenure promotion was repeatedly delayed and finally achieved long after those who



FIG. 3. Jack Major crossing an Alaskan stream in 1982, on his way to visit the research area of (then student) Ann Odaz. Photo courtesy of Dr. Odaz.

understood the value of his work would have awarded it.

He was a gentleman scholar: learned but soft-spoken and modest to the point of self-effacement. If presented in conversation with an opinion contrary to his own, he was sincerely quizzical and would quite innocently ask why one thought that way, rather than offering a defensive or challenging counter-statement. In this manner, Jack made those around him feel equally learned. Even when he disagreed with them, his own contrary opinions were delivered so delicately and non-confrontationally (usually ending with his traditional phrase, "Is this alright?") that the recipients might not realize their logic had been shredded until reflecting on it some days later.

His forte in teaching was with small groups. His low-key manner was not well suited to large lecture sections or busloads of fieldtrip students. On hikes in the field, a student had to be self-motivated enough to keep up and crowd close around him while he pointed out species and talked of their indicator value. Those who hung back missed a great education. His method of teaching was So-



FIG. 4. Jack and Mary Major hiking in the Grand Tetons in 1992. Photo courtesy of Ted Major.

cratic, inviting questions and asking questions back, usually including his stock phrase, "Is this alright?" because he didn't want to lose anyone. His classes and his research interests were reflected in theses, dissertations, and publications: alpine plant communities (Burke 1979; Neilson 1961; Major and Taylor 1977, 1988), biogeography (Taylor 1977), California vegetation (Barbour and Major 1977, 1988), gradient analysis (Waring and Major 1964), plant ecophysiology (Macdonald 1981; Barry 1968), plant-soil relations (Myatt 1968), systematics (e.g., Gankin 1957), the history of ecological concepts (Major 1969), and vegetation change (VanKat 1970). He was mentor to more than 20 graduate students of his own and to many more via correspondence or by way of serving as a member on their thesis/ dissertation committees (Fig. 3).

We join his wife Mary and sons Paul, John, and James, and brother Ted in their sorrow at his physical absence among us now; but the memories of his delight in the high country remain with us (Fig. 4). A modified version of this memorium recently appeared in the *Bulletin of the Ecological Society of America* (Barbour et al. 2001).

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